

**WHAT IS CLAIMED IS:**

1. A transmission medium for use in broadband applications, the transmission medium comprising:

a substrate having a substantially flat top surface and two lateral faces;

a signal conductor and two ground conductors placed on the top surface of the substrate forming a ground-signal-ground pattern along a common plane, wherein the ground conductors extend to the edges of the top surface of the substrate;

a respective electrical side-wall boundary on each of the two lateral faces of the substrate; and

a base.

2. The transmission medium of claim 1 wherein the base defines a cavity underneath substantially the entire length of the substrate.

3. The transmission medium of claim 1 wherein the base provides a common ground potential that is coupled to the two ground conductors and each of the two electrical side-wall boundaries.

4. The transmission medium of claim 2 wherein the cavity defined by the base is air filled.

5. The transmission medium of claim 2 wherein the cavity defined by the base is filled with a dielectric material.

6. The transmission medium of claim 1 wherein the electrical side-wall boundaries comprise conductors wrapped around the lateral faces of the substrate.

7. The transmission medium of claim 1 wherein the electrical side-wall boundaries comprise a plurality of conductive vias connecting the top surface of the substrate to the base.

8. The transmission medium of claim 2 wherein the base comprises a plurality of conductive ribs.

9. The transmission medium of claim 1 further comprising a Monolithic Integrated Circuit.

10. The transmission medium of claim 9 wherein the Monolithic Integrated Circuit comprises a top surface and wherein the Monolithic Integrated Circuit is arranged such  
30 that the top surface is approximately coplanar with the top surface of the substrate.

11. A method of fabricating a transmission medium for use in broadband applications comprising the steps of:

providing a pre-fired ceramic base;

providing a co-planar waveguide having a signal conductor and two ground  
35 conductors;

arranging the co-planar waveguide on the base;

removing base material from underneath the co-planar waveguide thereby making a cavity; and

co-firing at least the base and the co-planar waveguide.